METHOD AND APPARATUS FOR VARYING A MAGNETIC FIELD TO CONTROL A VOLUME OF A PLASMA

Abstract of the Disclosure

A plasma confinement arrangement for controlling the volume of a plasma while processing a substrate inside a process chamber includes a chamber within which a plasma is both ignited and sustained for processing. The chamber is defined at least in part by a wall and further includes a plasma confinement arrangement. The plasma confinement arrangement includes a magnetic array disposed around the periphery of the process chamber configured to produce a magnetic field which establishes a cusp pattern on the wall of the chamber. The cusp pattern on the wall of the chamber defines areas where a plasma might damage or create cleaning problems. The cusp pattern is shifted to improve operation of the substrate processing system and to reduce the damage and/or cleaning problems caused by the plasma's interaction with the wall. Shifting of the cusp pattern can be accomplished by either moving the magnetic array or by moving the chamber wall. Movement of either component may be continuous (that is, spinning one or more magnet elements or all or part of the wall) or incremental (that is, periodically shifting the position of one or more magnet elements or all or part of the wall).